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BART AND THE HANDICAPPED

by ROBERT LEVINE

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BART AND THE HANDICAPPED

by ROBERT LEVINE

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The author, however, assumes full responsibility for all interpretations and conclusions.

I. INTRODUCTION

This report is a survey of the extent, nature, quality, and history of the BART system's special facilities for handicapped persons. It is intended both to contribute to the total body of information being developed by the BART Impact Program about the system's characteristics and its impact on travel behavior and to provide input into MTC's ongoing UMTA-sponsored Special Transit Needs Study. It is a preliminary study, one which will be further developed by several of the BART Impact Program's projects and the Special Transit Needs Study.

II. SUMMARY AND CONCLUSIONS

Ramps, elevators, curb cuts, special gates, and a dozen other facilities for handicapped and elderly persons are a part of BART, the Bay Area's new rapid transit system. BART's facilities are the results of pioneering efforts to create a barrier-free public transportation system for persons with a wide variety of physical handicaps, including those confined to their wheelchairs.

BART's decisions to provide special accommodations for elderly and handicapped persons were made step-by-step throughout the period of design and construction of the system in response to community pressures and legislative requirements. Architectural standards adopted by BART in 1965 included some special design details for stairs, ramps and handrails to facilitate access for persons with some physical handicaps.

Later, in 1968, when construction of the system was underway, the California State Legislature passed an act requiring that all public facilities be designed for access for four categories of handicapped persons as defined by the American Standards Association: persons who were semi-ambulatory as well as non-ambulatory (in wheelchairs), persons suffering from disabilities of incoordination, and those with disabilities associated with aging.

The most significant aspect of this legislation in terms of BART was its requirement that persons in wheelchairs be given access to the system. In order to fulfill this requirement BART installed elevators in all of its stations, at a cost estimated to be approximately 8 1/2 million dollars in 1969.

This decision can be viewed as a major planning step in assigning to BART the responsibility of providing for the handicapped the long-haul section of a regional transit trip. At this time, public transportation on a local level is not available for many handicapped persons, and thus BART's capability to serve them has not been fully tested. Changes in the design, availability, and use of mass transit, para-transit service, curb cuts, and other accessibility features should offer greater transfer ability to BART in future years.

The lack of an early commitment and comprehensive plan as well as the developmental nature of the effort to accommodate a variety of handicapped persons continues to cause some problems for handicapped persons who use BART. Little special assistance has been provided for persons with sight or hearing difficulties, for instance. Also, elevators are awkwardly located in many stations since they were added after designs were complete and construction underway. Because elevators are located in out-of-the-way places and because some of them move between free and paid areas, attempts have been made to guard them from use by criminals and fare evaders by designing them to be activated by remote controls, and by omitting signs to notify patrons of their locations. Efforts to minimize uses of the elevators have resulted in increasing the difficulties associated with using them by the handicapped persons for whom they were designed.

During the process of providing facilities for handicapped persons, BART debated the many crucial issues which continue to arise in conjunction with transit planning for handicapped persons. The main issue faced but not completely resolved by BART is that of the propriety of the use of mass public transportation as a means of providing mobility for persons with physical handicaps. The judgment involves weighing economic, philosophical, and political factors. It is composed of assumptions about the purposes and uses of public facilities and urban amenities. The needs of a minority of the population must be weighed against the cost of special facilities which are financed by the tax dollars of the entire public. The possibility of providing a significant and badly needed service to a transit-deprived group must be considered in relation to planning for the mainstream of the public for whom public transportation is often just one alternative to other available modes of travel. And, finally, a judgment must be made of the extent of the public to be served. In terms of surveys reflecting the proportion of handicapped persons in the population at any single moment in time, those needing special facilities are a small minority. In terms of the length of time a facility such as an elevator will be available to the public, the total number of persons temporarily handicapped, permanently handicapped, and handicapped in various ways by the aging process who will use the facility can be expected to be quite large. These issues continue to confront the BART District as well as transit planners in other metropolitan areas.

III. THE DECISION PROCESS

BART began revenue service in a world removed from its conception by the social changes of the decades of the 1950's and 1960's. During that time transformations in assumptions about the role of public transportation changed many expectations of transit systems. Once seen as private, profit-making enterprises, public transportation systems in the 1960's were no longer sustained by fare box revenues in major metropolitan areas.[1] Public transportation was beginning to be seen as a public service, with an obligation to serve transportation-deprived groups of people.

In the Bay Area, people with physical limitations began to attempt the removal of barriers which stood in the way of the fullest use of their capabilities in the decade of the 1960's.

"We learned from the Black movement," says Phil Draper of Berkeley's Center for Independent Living.[2] Some of the flavor of that lesson is apparent in an often-repeated assertion by Harold Willson, a vocal representative of handicapped persons, "Segregated facilities are inadequate."

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[1] Bailey, John A., and Michaels, Richard M.: The Problem of Mass Transit in a Metropolitan Area. Evanston, Illinois: Northwestern University, 9.d.).

[2] Conversation with Phil Draper, August 29, 1974.

New drugs and medical innovations were important catalysts for change for handicapped persons during the decades of BART's planning and construction. The first antibiotic drug was used in this country in 1938. By the 1950's and 1960's antibiotics were keeping persons with severe disabilities alive and in reasonably good health for the first time in history. New therapies, new prosthetic devices, and motorized wheelchairs extended the boundaries of independence and self-sufficiency for handicapped and elderly persons. By the 1960's persons with physical disabilities in societies, clubs, and associations were sufficiently numerous and energetic to begin to ask that their needs be recognized and met. One of the first, most pressing needs was for increased mobility to widen the range of daily choices and to make normal work, recreation, and social interactions possible. The goal was the removal of architectural barriers to mobility for all physically handicapped persons.

Pressures from handicapped and elderly persons for special accommodations reached BART in 1962 before the first excavations had begun. Harold Willson, a representative of the Easter Seal Society's Architectural Barriers Committee, wrote to BART at that time to begin to introduce to them the idea of incorporating design details which would make the system usable by handicapped persons. As a wheelchair-bound, employed taxpayer in the BART district, Willson personified many of the needs. He lived near one of the proposed BART stations and worked within rolling distance of another. The BART staff soon began to listen to Willson's advice in matters relating to handicapped persons.

Willson took to BART the standards for design of public facilities which had been adopted in 1961 by the American Standards Association to make buildings and facilities accessible to the physically handicapped. The standards were voluntary, but they provided a conceptual basis for planning; they not only outlined detailed specifications for walks, ramps, stairs, rest rooms, and other common facilities in terms of the needs of handicapped and elderly persons, but they defined the varieties of handicaps into six categories.[3]

Willson discussed ASA standards as well as other design and procedural matters with the BART staff. In 1964 he was consulted on matters such as planned 20-second station dwells, and the two-inch space between trains and platform which would be necessary for train operations. Willson foresaw no problems with either situation for persons with physical handicaps. He advocated the inclusion of elevators in the system, as well as specially designed restrooms, and light, self-actuating doors which would swing inward at all entryways within the system.[4] During this early period of design, BART also received advice about the special needs of handicapped persons from Louis Gelwicks, architect and member of the Architectural Committee, and from Alan Jenkins of the State of California's Orientation Center for the Blind in Oakland.[5]

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[3] American Standards Association, Inc. American Standard Specification for Making Buildings and Localities Accessible to, and Usable by the Physically Handicapped. Approved October 31, 1961. ASA #A117.1-1961. See Appendix.

Many of BART's design features were ready-made for handicapped persons. Level loading from platforms to trains was a feature planned for the convenience of everyone; escalators were accepted as a desirable feature for all vertical distances of 12'. Moreover, BART planned to provide a seat for every passenger, a consideration of comfort aided to assist in the competition with the private automobile, and one which would serve to make riding BART possible for some handicapped persons. Train doors had been planned to be sufficiently wide to accommodate several passengers at one time, and therefore would be amply wide for a wheelchair. Service gates were to be features of every station for the convenience of BART personnel and service workers, to serve as emergency exits and to permit the entry of equipment. Their width as planned was sufficient to permit the passage of wheelchairs.

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[4] Bay Area Rapid Transit District: Correspondence, April 17, 1964. George L. McDonald, Director of Public Relations, to file. BART Central File #105.0706.

[5] Bay Area Rapid Transit District: Manual of Architectural Standards, June, 1965.

A number of specific design details conforming to ASA Standards were incorporated into BART's plans in the first of two critical decision-making periods in the history of BART's provisions for handicapped persons. This initial period occurred in the years between 1962 when funding was authorized, and June 1965, the date of adoption of official design standards by the District. Final design standards conformed to ASA provisions in terms of width of gates and doors; in requirements for non-slip floor and stair treads, in specifications for stair widths, risers, handrails, ramps, and in provisions for changes in floor texture at each end of stair runs.[6]

Elevators, however, were deliberately omitted. "Normal circulation through the BART system should be planned so that handicapped patrons, except those in wheelchairs, can move easily to their destination," reads section 1.7D of BART's Manual of Architectural Standards.

This decision was a logical outgrowth of the main purposes for which the system had been planned. A Composite Report had been issued by BART's major consultants in 1962, when voters were considering the issue of authorizing funds for the system. BART was described in the report in terms of its automated services, its comfortable cars, and its convenient service.

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[6] Op. Cit. ASA Specifications. See Appendix for details of ASA specifications.

[7] Consultants to the S.F. BART DISTRICT: Composite Report. May 1962, pages 81-85.

The report also detailed the consultants' expectations of BART's benefits. The new system was expected to alleviate problems of traffic congestion, discourage urban sprawl, increase property values, employment opportunities, and the mobility of the labor force, as well as improve access to social, cultural, and recreational opportunities.[7]

In terms of the perceptions of BART's planning consultants as described in the Composite Report, BART's main obligation was that of service to the mainstream of the public; those citizens willing and able to pay full fares, navigate turnstiles, read directional signs, and walk the vertical and horizontal expanses of the stations. The primary group of future BART patrons portrayed in the Composite Report were those travelers with a choice between the automobile and public transit. Other kinds of future patrons were also mentioned; those without an available automobile, and elderly persons "who do not want to face the rigors and hazards of freeway driving, or the inconvenience of parking".[8] Moreover, the financial projections shown in the report indicated that the costs of the system would be covered by fare box revenues.[9]

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[8] Ibid., pages 81 and 83.

[9] Ibid., page 48.

Service to persons with physical handicaps was not foreseen at the time of the publication of the Composite Report, or of the 1962 vote which authorized funding for the system. While BART officials were receptive to Harold Willson's suggestions, the extent to which design changes were made depended on their cost, and on considerations of convenience and safety for the mainstream of the public. The factors which were the basis of the decision to exclude elevators from design standards in 1955 were clarified during the course of an exchange of ideas between design engineers at BART and at BART's engineering consulting firm, Parsons, Brinckerhoff, Tudor and Bechtel. "The means of facilitating all of these (the six categories of handicapped persons outlined in the ASA standards) may not be economically justified, no matter how 'inhuman' they may appear", writes Deane Aboudura, BART's Chief Design Engineer. A. E. Wolf, PBTB's Design Engineer, agreed that the ASA's first category of handicapped persons, those who were non-ambulatory, could not reasonably expect access to BART. More than thirty stations located in three counties and in fifteen communities would have to be designed with wheelchairs in mind "at every turn", as Mr. Wolf reminded the staff. He foresaw that if wheelchairs were provided, "no halfway measures will suffice ... once in and they must be allowed to go to their destination, so at every turn there must be special provisions, and at each station and on every train.

Their problems are not known since they are not accommodated on existing systems and they do not ride transit vehicles."[10]

BART was performing a pioneering public service even without providing elevators in Mr. Wolf's view, since the system would serve all categories of handicapped persons except the non-ambulatory. Using figures from a National Health Survey, he calculated that BART would serve 99% of the public, denying access only to those persons confined to their homes, to institutions, or to their wheelchairs.

Harold Willson disagreed with this argument both in terms of the specific figures derived from the National Health Survey, and in terms of the entire philosophy implied in estimates of all the numbers of persons with physical handicaps at any one instant in time. "All of the surveys and counts ... are irrelevant to the barrier-free environment issue, and ... tend to promote programs that will isolate the elderly and handicapped into high operational cost facilities and segregated, inadequate transportation system," he maintained. He pointed to the fact that life spans were increasing, that old persons frequently suffered physical limitations, and that the possibilities were very high that any person would be handicapped at some point in the course of a lifetime.[11]

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[10] Bay Area Rapid Transit District: Correspondence: D. A. Aboudura to A. E. Wolf, June 18, 1964: A. E. Wolf to D. A. Aboudura, August 31, 1964. BART Central Files #105.-706.

Mr. Wolf, who joined the BART staff in the mid-60's, believed that considerations of safety for wheelchair-bound patrons were sufficient reason to exclude them from BART. "In the event of a disaster," he worried, "wheelchairs would be unable to navigate the narrow walkways in the tunnels and on aerial structures."[12]

"An over-protective, 'mother' attitude," replied Wilson. "Handicapped persons will gladly take the risk in exchange for mobility."[13]

The cost of providing special facilities proved to be the main argument against them. By the mid-sixties pre-BART District was experiencing a shortage of funds for basic design details. Taxpayers' suits and strikes had delayed the start of construction, and cost had increased during the months of inflation while the work was at a standstill. Not only had elevators been ruled out of consideration because of their cost, but also one previously planned design feature which would have aided persons with physical handicaps. Platform screens had been included in design standards as a safety feature to guard platform edges. They were dropped from the plans, thereby reducing safety somewhat for everyone and raising the hazard level considerably for blind persons.

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[12] Conversation with A. E. Wolf, September 5, 1974.

[13] Bay Area Rapid Transit District Correspondence. Memo to files from A. E. Wolf, June 10, 1966. BART Central Files #105.0706.

Final adoption of design standards which specifically excluded elevators from the BART system did not cause Harold Wilson to abandon the idea. He became a frequent speaker at conventions and meetings of groups of handicapped persons as well as at the meetings of other social, political, and religious groups. To each group he presented his ideas about needs for special facilities for handicapped persons in BART, and suggested a format for suggestions to the District. For three years a stream of letters flowed to BART's Board of Directors and its staff from handicapped persons, their societies and clubs, and from doctors, rehabilitation agencies, Councils of Churches, members of Congress, and from the Board of Supervisors of San Francisco. These advocates asked that the BART District provide elevators, or consider such alternatives as moving ramps. They asked also that restrooms be re-designed to be usable by persons in wheelchairs, and that parking lots be planned to include special stalls for handicapped persons.

The dozens of letters, a score of visits to BART by Willson in his role as advisor, and appearances before the Board of Directors by Willson and by other advocates had two minor results in 1966. The possibility of providing moving ramps which would transport wheelchairs on the vertical inclines between streets and train platforms was studied and rejected.

The cost of such ramps was found to be far greater than the cost of elevators, and the space which they would require in stations far in excess of the space required for elevators. The second action was a resolution by BART's Architictural Review Committee directing the staff to provide for future installation of elevators in initial station designs.[15] Unfortunately, in terms of later problems which emerged, the spirit of this resolution was not closely followed. Freight elevators were provided between platform and mezzanine levels of subway stations, and designs allowed for shaftways for freight elevators between mezzanine and street levels. No special provisions were made for elevators in aerial stations on the assumption that those designs would not preclude space for elevators.

A far more substantial decision was made by BART's Board of Directors on February 29, 1968. At that meeting, the Board approved in principle the inclusion of elevators in the system. The important factor which made the resolution one of principle rather than action was the stipulation that funds must be made available for the elevators from a source outside the system, and that such funds must be above and beyond those needed to complete the basic design of the system.[16] The District was asking for $144 million from the California legislature at that time. It now included a request for an additional $7 million needed to include elevators in BART.[17]

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[15] Bay Area Rapid Transit District: Correspondence - Memo to Chief Design Sector from J. Culp, July 1, 1966. BART Central File #105.0706.

The Board's decision to adopt an official stance in favor of providing elevators in BART stations marked the beginning of the second major decision-making period in the provision of facilities for handicapped persons. The years 1968-69 brought a climax to the efforts.

A colorful illustration of the pressures brought to bear during the decision process occurred in March of 1968. An ad hoc committee calling itself the Committee for the Freedom of Mobility of the Disabled called for a demonstration on a morning that March. People in wheelchairs and on crutches and some with white canes, all carrying banners proclaiming the need for elevators in the BART system converged on the construction site of the downtown Berkeley BART station. Work was halted by the demonstration that morning. The result was wide press coverage which added to the public's awareness of the issues.

Pressures were mounting on another front in the late 1960's which were to have a decisive effect on BART's course of action. In Sacramento, legislators were hearing petitions for funds for BART's elevators not only from BART, but also from Harold Willson. Willson had carried his campaign to the legislature once the Board had declared itself in favor of the inclusion of elevators. BART and Willson were joined in Sacramento at that time by representatives of the Architectural Barriers Committee of the Easter Seal Society. This Committee was asking for a law which would guarantee the inclusion of ASA standards in design specifications for all public facilities. Their victory came in 1968.

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[16] Bay Area Transit District Correspondence. BART General Manager B. R. Stokes to Assemblyman Willie L. Brown, July 8, 1968. BART central file #105.0706.

[17] BARTD Correspondence: BARTD Director William Reedy to James McSharry, June 14, 1968. BART Central Files #105.0706.

"Blind persons ... and other physically disabled persons shall be entitled to full and equal access, as other members of the general public, to accommodations, advantages, facilities, and privileges of all common carriers ..." reads Chapter 461 of the California Statutes of 1968, a resounding success for the efforts of handicapped persons and their advocates. The legislation established the legal right of blind and handicapped persons to use public facilities, and was passed on the heels of another landmark bill, AB 7, signed by the Governor in June, detailing the specific parts of the ASA specifications which must be met in the design of public facilities.

Requirements of the new legislation effected BART in some rather minor matters, such as details of the grading of public walks and of provisions of handrails. Its most significant requirement was the requirement that elevators be included in stations, and that restrooms be redesigned to accommodate persons in wheelchairs. For BART the demands of the new law posed serious problems. Funds were short, and construction and design of stations had reached an advanced stage in the case of twenty-seven of the thirty-eight stations then planned. BART now faced a dilemma which only ample funds could solve. The Board had declared itself in favor of elevators, and the law had required it: the Board, staff, and their advisor, Harold Willson, all continued to ask the legislature in Sacramento for victory in March of 1969, when the California legislature voted $150 million in additional funding for BART, with the stipulation that handicapped persons in wheelchairs be provided access to the system.

For handicapped persons and for BART, each barrier removed in the effort to provide full access to handicapped persons revealed a new range of problems. This time PBTB, BART's major contractor, recommended only three months after the provision of funding that the Board reconsider its decision to include elevators in all stations. In view of the District's overall financial picture, PBTB engineers told the Board, the installation of elevators in each and every station was impractical. On the basis of PBTB's assessment of the situation, the Board approved elimination of provisions for elevators in ten specific stations. Stations to be built without elevators were Bay Fair, Coliseum, South Hayward, Balboa

North Berkeley, Lafayette, 24th and Mission, MacArthur, El Cerrito Del Norte, and Pleasant Hill. Some were designated because they were in advanced stages of construction; in some the placement of the elevator would pose awkward design problems; and others were eliminated as logical pattern choices, since they were located in areas where there were no apparent needs, and where patrons could easily reach another BART station which would be equipped with an elevator.[18]

There followed an unprecedented outpouring of objections. City councils of many communities passed formal resolutions which not only urged inclusion of elevators in all stations but suggested the BART decision was illegal, in view of the expressed intent of the legislature. The City of Berkeley prepared a suit against BART on these grounds. Mayor Wallace Johnson of Berkeley, a leader of the pro-elevator forces, was also a member of the BART Board of Directors at that time; from both positions he launched his campaign to see that all stations had elevators. The Alameda County Central Labor Council added its voice, along with Senior Citizens Centers, the Board of Supervisors of Alameda County, handicapped individuals, clubs, societies, and the doctors, social workers and lawyers who were their associates. On September 11, 1969, the Board reconsidered its decision: elevators would, at last, be installed in each and every BART station.

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[18] Resolution #1381 approved by the Board of Directors, Bay Area Rapid Transit District, July 17, 1969. BART Central File #105.0705.

Compliance with the law was assured, but the story of BART and the handicapped was not ended. The decision to make the system accessible meant the fulfillment of Mr. A. E. Wolf's prophecy that the handicapped must be accommodated "at every turn". Complications are many: each new piece of equipment installed in the BART system brings with it a need for special design specifications so that all parts of the BART system will be usable by patrons with a wide variety of handicaps. The decision to provide elevators ushered in an extended period of negotiations with local communities for space for elevator entrances. Planning for downtown stations in Oakland proved the most difficult. Oakland officials refused to relinquish sidewalk space, making it necessary to secure the necessary permission from private property owners in the neighborhood. An elevator from street mezzanine in the Oakland 12th Street Station is not now available, five years after the Board's decision, because sidewalk space could not be secured, and the facility must be placed in an area in which construction is underway, under the jurisdiction of an agency outside of BART's area of authority.

By August of 1973, however, when three of four lines were in operation, most stations had been completed with elevators and other facilities for handicapped persons intact. Harold Willson and a delegation of the Paralyzed Veterans of America t the system with BART's Director of Installations, Wilmot McCutc

Carefully inspecting stations and trains with the law's requirements in mind, they found a dozen minor adjustments needed for full compliance. Some stations lacked adequate marking for handicapped stalls; some elevators were not properly operating; some doors were difficult to open, and here and there were missing ramps and curb cuts.

When the work outlined by the 1973 tour has been completed, the system will fully comply with the law's requirements. Even with full compliance, however, there will remain questions about BART's total range of responsibilities. For instance, AB 7 excluded specific recommendations for accommodations for persons with sight and hearing impediments. The extent to which BART will and should plan for these patrons is a continuing matter of concern and negotiation. Matters such as elevator maintenance, training for station agents in their roles as aides for handicapped persons, and the design of fare equipment are not covered the letter of the law. The continuing decisions yet to be made will finally determine the quality and extent of BART's service to handicapped persons.

The BART staff is currently dealing with some problems at some levels. For instance, the Passenger Service Department has recently held a series of meetings with visually-disabled groups to teach them methods of using the system. A task force to deal with the wide variety of problems associated with BART's handicapped facilities has been organized. Task force members would include representatives of several BART departments.

Handicapped persons do ride BART, however. Some find it a means to travel to a regular job, and these have joined the crowds of commuters who use the system daily. The hope that public transportation will provide the mobility needed by persons with physical handicaps is the hope that keeps Harold Willson and other leaders active in the effort to remove barriers. For BART, the special facilities represent the achievement of a breakthrough in the design of public transportation. Technical, conceptual, and design problems faced by BART in implementing the program stand as guides to all other public transportation authorities who will surely be confronted with requests to comply with the spirit of laws which stipulate equal access for all persons to common carriers.

IV. THE BART TRIP FOR THE HANDICAPPED

This chapter has three parts:

A. Evaluation of accessibility within the BART station area;

B. Evaluation of transfer to and from BART stations;

C. Frequency of elevator use in BART stations.

The purpose of this chapter is to report how the BART system functioned for the handicapped in September 1974. Section A includes the observations made by a study team using the system, and relevant background information. Section B evaluates the use of the BART system, given the existing level of transfer or lack of transfer to BART. Section C includes elevator counts made by BART staff over a ten day period.

A. Accessibility within the BART Station Area

A study team of six persons, staff members of BART and MTC and members of the handicapped community, visited BART stations and rode the trains in August and September of 1974, Five of the six members of the study team have physical disabilities resulting from various chronic conditions. Though each member has unique mobility problems and unique means of coping with them, each can be described by one of the six general American Standard Association categories of disability used by BART to design facilities for the handicapped.

Two of the members are non-ambulatory, in wheelchairs, representing ASA category #1: "Impairments that, regardless of cause of manifestation, for all practical purposes confine individuals to wheelchairs." Two are semi-ambulatory, using crutches and leg braces, described in ASA category #2: "Impairments that cause individuals to walk with difficulty or insecurity; individuals using braces or crutches, amputees, arthritics, spastics, and those with pulmonary and cardiac ills may be semi-ambulatory." One team member has limited vision, a sight disability described in ASA category #3 as: "Total blindness or impairments affecting sight to the extent that the individual functioning in public areas is insecure or exposed to danger."

Three of the ASA categories were unrepresented by our group, which made efforts through the trip to understand problems that might exist for them. They are described in ASA categories in the following ways:

4. Hearing disabilities: "deafness or hearing handicaps that might make an individual insecure in public areas because he is unable to communicate or hear warning signals."

5. Disabilities of incoordination. "Faulty coordination or palsy from brain, spinal, or peripheral nerve injury."

6. Aging. "Those manifestations of the aging processes that significantly reduce mobility, flexibility, co-

ordination, and perceptiveness but are not accounted for in the aforementioned categories."

It should be noted that, though facilities are designed to meet standards that will satisfy a group, whether for the disabled or the able bodied, the testing and use of any transportation system is done on a person by person basis. Also, the utilization of the system by the individual traveler goes beyond utilizing individual facilities, because an appropriate combination of system attributes is needed to facilitate system use.

Conversely, a travel barrier anywhere between trip origin and destination can restrict a potential trip.

1. Access to Station Paid Areas

Entrance to the paid areas in BART stations have been designed to be usable by all categories of handicapped persons. Those who are ambulatory patrons pass through the regular fare gates (as do any other patrons). Those with sight problems may require an agent's aid in processing a ticket through the gate. Those in wheelchairs ride easily through service gates located near the agent's booth, while the station agent processes the ticket. All of these procedures work efficiently as long as a station agent is available and helpful.

For blind persons, the station areas are unmarked, undeterminate expanses of space. No textured paths, no audible signals of any kind exist to suggest the correct direction of travel. To maneuver in the system from the time of arrival through the purchase of a ticket to boarding a train, a blind person unfamiliar with the system must depend on someone else as a guide. With experience a blind person can learn to navigate any station but would still require assistance as to which train to board.

BART stations pose special problems for people who must use the elevator. Elevator entrances at street levels are sometimes located in structures emerging from the sidewalk and sometimes in office or shop buildings along the way. In one station the elevator entrance is in a parking lot, in a structure resembling a ventilator shaft. In some cases, awkward locations of entrances are due to the refusal of local officials to allow the elevators to emerge in public sidewalks. In others, the cause can be traced to the late inclusion of elevators in station design and construction.

Whatever the cause, elevators are often difficult to locate and no station agent is available to direct a patron at a street entrance at subway stations to the elevator. No signs or directions indicate the location of elevator entrances. This omission is deliberate, an attempt to restrict the use of elevators to those with a legitimate need. Although closed-circuit TV cameras outside some elevator entrances provide surveillance, it has been the judgement of BART officials that the elevators must be inconspicuous to provide an added element of protection. Persons needing to use elevators can call BART's passenger information service in advance of a trip to learn the location of elevators in stations that will be used.

The act of purchasing a ticket from BART's automatic vending machines poses problems for those with sight disabilities, limited use of hands and arms, and for some persons in wheelchairs. The coin and ticket slots of the fare equipment are above the reach of some wheelchair bound persons. For handicapped persons able to reach the mechanism, however, the design is helpful, since only push-pull motiions are required to manipulate the equipment, rather than lifting or twisting motions. For those who cannot reach or manipulate the mechanism the ticket must be purchased with someone else's aid, or bought ahead of time at one of the banks which service as ticket vendors for BART.

At MacArthur Street Station the elevator is located outside the main station area, across a major four-lane street with a raised median strip. Any patron who arrives at the main station or who needs information or a ticket from the main station must traverse the difficult path between these two points, with neither curb cuts for wheelchair users nor an activated traffic light for anyone. The City of Oakland is responsible for improving this situation, which is outside of BART's jurisdiction.

2. Escalators and Stairways

In all BART stations one must travel in a vertical direction to reach a train platform. In aerial stations one travels the distance of one floor between street and platform, while in most subway stations one must travel between two levels, those of street to concourse, and concourse to platform, with a pause at the concourse level to process one's ticket through the fare gate. The journey is generally smooth and rapid for ambulatory and some semi-ambulatory persons, since both stairways and escalators are readily available. One semi-ambulatory person in the study team found escalators the most comfortable mode because of their central station location. A second semi-ambulatory person was not able to use escalators but was able to use the stairways.

Escalators were well-marked by changes in texture at both ends so that persons with sight disabilities are alerted as they are approached. Stairways, however, were not marked by a change in texture as one approached them in most stations. Since the 1968 law had omitted specifications directed specifically to blind persons, the station designers had not been required to include these.

3. Elevators

Elevators were available in all but three stations at the time of the survey. In these three, their installation was delayed because their street level doors will be located in buildings currently under construction.

It became evident to study team members that problems associated with using the elveators are sufficiently severe to discourage their use. Elevators were tried in seventeen stations during the survey; in only nine of the seventeen were elevators working properly at the time of the visits.

In some stations, the study team experienced lengthy delays between the time of calling a station agent and receiving an answer. Once the elevator arrived, doors usually opened to permet entry, but not always. The elevator on occasion merely paused and moved on without opening its doors to allow entrance. At other times, members of the team entered the elevator, the doors closed and a rather long wait ensued. The elevators move very, very slowly and it is difficult to ascertain from the inside whether or not they are in motion. The result is often a long wait before patrons know that the elevator is not functioning. Then another call to the station agent is necessary so that the problem will be remedied. Sometimes the elevator moved, traveled to the desired level, but returned to the point of origin before the doors opened. The station agent when contacted by telephone often seemed not to know at which level the elevator was located, whether or not it had moved, or whether the doors were operating properly.

Many of the problems are due to maintenance problems, and some to faulty procedures. For instance, some elevators are equipped with pressure sensitive floor pads which detect the pressures of a passenger. These pads are frequently out of order because service personnel use the elevator to transport heavy money carts, and the mechanism is distrubed during this process. Sometimes service personnel turn the elevator's "dead switch" when unloading carts or cleaning the elevators. If the switch is not re-activated, a rather common occurrence, the elevator is not in working order for patrons.

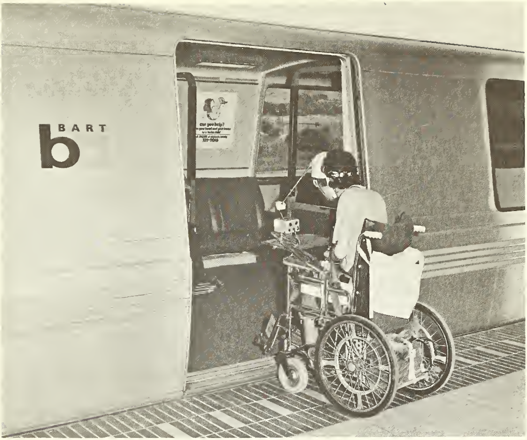
The station agent is a crucial factor in providing service for handicapped persons on BART. A potential elevator user must call the station agent by means of an intercom button or a courtesy telephone outside the elevator door, because it is the station agent who allows the elevator doors to open or activates the mechanism in most stations. If the agent is busy providing information to passengers, it may be several minutes before the call is answered. If problems exist in operating the elevator, the agent may have to leave the booth to open the elevator control box and correct the problems. (Occasionally a station agent may forget to activate an elevator after contact has been made if other problems arise to capture the agent's attention. Handicapped members of the study team reported that this is a common occurrence).

While there are a variety of causes of problems with elevators, the effects in terms of patrons' experiences are much the same. The problems mean lengthy, frustrating experiences for those attempting to use the system. The journey by elevator is time consuming: the average time required from street to platform as measured by team members was five minutes in subway stations; in the downtown Berkeley station one morning the total time was twelve minutes. Trains are missed, appointments kept tardily, and people arrive at their work places late when elevators are used, unless an unusually long time is allowed for the BART trip.

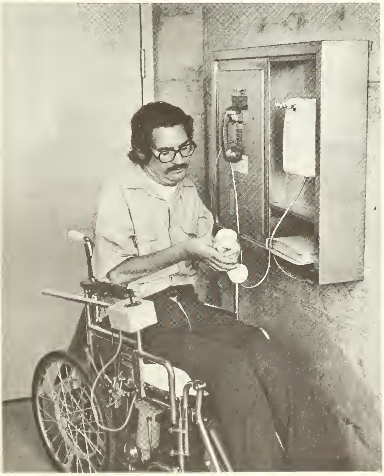
Several problems which do not have a direct bearing on elevator performance, but which influence the ease with which they can be used, were discovered in the course of the survey.

a. No signs or directions exist within the system to indicate the location of an elevator. No promotional literature announces the existence of elevators, except the small "BART Information" booklet for handicapped persons which is available through rehabilitation centers, schools, clubs and hospitals. A patron might travel the long distance between a train and a platform end only to discover that the elevator is located in the other end. Reasons for the lack of signs and information are the fear of fare evaders, or that elevators will be used by criminals who would endanger handicapped patrons. Late inclusion of elevators as part of the plans for the system resulted in both awkward, out-of-the-way placement of them, and in elevators which move between free and paid areas, thus making fare evasion possible.

b. Some of the white-colored courtesy telephones, needed to contact the station agent are recessed into the wall, making it impossible for persons with limited use of arms and hands to remove the receiver. At the downtown Montgomery Street Station in San Francisco, the telephone was positioned too high off the floor to be reached by a person in a wheelchair. In a few locations an intercom button is available near the elevator, rather than a telephone. It is easier for many handicapped persons to manipulate a button than a telephone, and the study team found them far more satisfactory for our wheelchair consultants. In a very few stations, elevators have push-button activators within reach of patrons, so that patrons can operate the elevator. In BART this is possible only when the elevator travels from a paid to another



Level entrance from platform to train



Use of courtesy telephone to contact station agent

paid area. Late inclusion of elevators in station designs precluded this arrangement, which is far more satisfactory in terms of the patrons' interests. Elevators descending from street to concourse, or street to platform are tightly controlled in terms of operation by the station agent who must ascertain that a fare is paid at some point in the journey. Early planning for elevators and for the circulation of persons using them within the system may be the solution for other transit systems which may benefit from BART pioneering attempts.

c. Some elevators are located within an independent structure or have special elevator vestibules. In one San Francisco station at platform level, the door to the elevator vestibule opens outward. A passenger in a wheelchair may not be physically able to open the door and pass through the door frame at the same instant, and thus he is effectively blocked from getting to the elevator itself. The MacArthur station elevator structure has independent turnstiles, ramps and doors at street level, and easy use of these facilities requires space for wheelchair radial turnaround and a door that yield more readily.

d. The fire alarm button in the elevator is too high

e. Perhaps most important, the distances which must be traveled in order to use the elevator system in many stations are enormous. This may be largely a result of including plans for elevators late in the design process.

At the North Berkeley station, the distance from central station area to elevator is about 300 feet. One member of the study team who is semi-ambulatory with a leg brace said, "It's like walking with a heavy load of groceries, you don't enjoy walking and tire easily."

Some suburban aerial stations, designed and constructed a little later than downtown stations, have elevators located close to the station agent's booth and only a few feet from the train entrance at the platform level. In some downtown stations, by contrast, a patron must travel the length of two or three city blocks between elevator and fare gate, fare gate and elevator to the platform, and elevator to train. For the non-ambulatory patron in a battery-motored wheelchair, only a loss of time is involved in this journey. For a non-motorized wheelchair user, a semi-ambulatory person, an elderly person, or a patron with heavy or

> or awkward bundles, or a person with small children who might find the elevator more convenient and comfortable and safer than either stairs or escalators, this lengthy distance discourages usage.

In stations where the elevator is obvious, accessible, and in working condition, it has proved useful for many persons who are not physically handicapped in the usual sense. Persons traveling with several small children can use elevators with ease and safety; elderly persons who suffer no specific disability except a low energy level can comfortably ride an elevator. Shoppers and all travelers with packages can use the system. In its opening years, BART station personnel were instructed to reserve the elevators for use of the handicapped persons only, but by the summer of 1974 policy had changed, so that anyone requesting to use elevators was allowed to do so.

4. Platform/Train Interface

Platform edges in all station were marked by a change in design for sighted persons. However, design changes were not texture changes in a majority of stations. Pattern changes achieved by a variation in brick or tile placement are too subtle to be detected by a tapping cane. Only in those stations in which materials used at platform edges varied markedly from those used for the total platform could blind persons detect the area leading to the edge of the platform. Changes from concrete to brick, or from concrete to rubber matting were sufficiently obvious to serve the purpose of alerting blind persons to the approach of the edge of the platform.

BART trains were originally planned to operate with a 2" gap between train entrance and platform edge. In actual operation the width of the gap varies and it is possible for wheelchairs to be caught and trapped, a situation which may be disturbing to a wheelchair-bound patron, but not dangerous since the doors will not close and the train will not operate until the wheelchair is freed. The gap could be a problem for cane and crutch users.

5. The Train Ride

The train ride was generally smooth and comfortable. However, some individuals in wheelchairs have stabilization problems during rapid acceleration and deceleration and the design of the car precludes special locations for wheelchairs. The survey was done during off peak hours and there was no indication of wheelchairs blocking the way of other BART passengers. There is no reason to assume that as a group wheelchair users on BART would form a major block in passenger flow at peak hour, as wheelchair users as a group are most likely under 0.5% of the population. The lack of stanchions made a standing ride at peak hours less comfortable than otherwise for the semi-ambulatory.

B. Transfer to and from BART Stations

The BART rail lines are a skeletal system that to a large extent requires auto and/or bus feeder and/or walking to complete a total trip. This was strikingly presented while reviewing some of the suburban stations. As one example, the Fremont station is located in an area that is visually vacant as of August 1974: only the BART parking lot, new city streets to serve the parking lot, and empty lots are close to the station structure. The study team travelled by foot or wheelchair to the closest building, about 2,000 feet from the station, to have lunch at a very quiet shopping center.

At this station, the decision by BART to provide level access for wheelchair users has entailed the provision of an elevator, a ramp from concourse to street, and three small individual ramps to traverse the curb adjoining three outdoor parking places. From that point on, the traveler is on his own. For the wheelchair user, his car has to be parked at one of these places. No local bus is available for those who can climb bus steps.

The study team met at the North Berkeley station, coming from various residences. Three came by auto (but are able to use local transit), two came by a specially designed para-transit vehicle with a ramp device (driven by a chauffeur), and one used a motorized wheelchair on city streets.

1. Bus Transfer

The decision to design certain BART facilities to meet ASA standards does not necessarily imply that easy transfer exists equally for different disabled groups between BART and other modes. As one example, some visually disabled can use existing local buses. Reduction in AC Transit transbay service resulting in transfer between AC and BART may limit mobility for this group, because the size of the BART station is a barrier while the small scale of the bus makes it easier to use tactile senses.

As a second example, wheelchair users at BART stations are frustrated because buses are not presently designed for level access, nor will the Muni Metro be at the surface end of a subway-surface trip. There is no indication that bus manufacturers will be requested by transit agencies throughout the nation in the near future to design new buses to provide level access, thus lowering unit cost. An exception at the regional level is BART's grant application to UMTA for two-thirds matching funds for buses to provide long-haul connector service to outlying East Bay BART stations. This application was amended in March, 1973 to include lift facilities as part of a total level access system. Upon joint agreement, the UMTA application was withdrawn by BART and submitted instead by AC Transit, which has not been approved pending section 13c (labor protection) agreement. Following an agreement made in September, 1974, between the two carriers, AC intends to operate existing equipment starting December 2nd. AC Transit will obtain new equipment after approval of the grant application, and retrofit each bus upon a satisfactory prototype testing at the AC Transit Dial-A-Ride system at Richmond. When lifts are provided, limited use can be anticipated until similar provision can be made by other carriers at the other end of the BART trip in the San Francisco and East Bay urban areas.

On the other hand, the coordination of AC Transit and Muni routes and schedules with BART provides transfer with relatively little walking. For the semi-ambulatory and elderly who rely on public transit, this coordination may increase their mobility. The exception is the case of the elevator user, who must travel at street level from an elevator located far from the local bus stop.

2. Auto Transfer

Parking lots have been provided at most stations (almost all except some in San Francisco, Oakland, and Berkeley). As noted, the lots have a few specially chosen parking spaces located as close to the station entrance as possible.

While they are well located they are not always well marked. Small vertical signs with the handicapped signal are placed by the spaces in some stations, which is helpful, as the parking lots are often extensive and a considerable amount of circling is necessary in order to locate the spaces.

The handicapped driver must apply for state license plates with special letter combinations starting with either "D" or "V" in order to legally park in special handicapped spaces. The driver must show loss of leg or use of mechanical mobility aid. An examination of parking at the Daly City station showed that according to the vertical sign, seven spaces are planned for. However, only in three of the seven spaces was the ground stencilled "handicapped" (and need to be repainted soon), and only in these stencilled places can a non-handicapped driver be ticketed by the BART police. In the three marked spaces, two cars had the special license plates, a third did not and had been ticketed.

BART has recently begun to issue special parking permits for handicapped persons without special licenses; a program especially useful for persons with temporary disabilities or for elderly persons. However, the program is not being advertised or announced. Only those handicapped persons who are sufficiently aggressive to ask BART for special help will learn of its existence. BART officials fear being overwhelmed by special requests, at a time when many parking lots are filled to capacity by early morning commuters and reserving extra stalls for handicapped persons might deprive other patrons of their access to the system.

For the handicapped driver who does have a parking space, the question of the other end of the trip must always be raised. Unless there is a second car parked at the distributor end of the trip, the passenger must rely on other modes such as bus, taxi, and walk. It is likely that many of these commuter trips have the work destination located close to a BART station.

3. Neighborhood Access

For those who live within walking distance of a BART station and need level access, curb cuts are provided within the station area but not within the immediate vicinity. An exception is the curb cut program in Berkeley; a program is also planned for in San Francisco. Private driveways become the substitutes but are not located at street intersections and may be dangerous.

C. Survey of Elevator Use

BART's station agents counted the number of times elevators were used in their stations for two weeks in the late summer of 1973 and 1974. The statistics show an increase in elevator use which is greater than the increase in total patronage at the stations: for East Bay stations, patronage in the two weeks of 1974 was 26.1% greater than it had been in the comparable two-week period of 1973, while the number of elevator trips had increased 50.8%.

The statistics lack precision and descriptive detail. There is no way to check their reliability; presumably some station agents were more conscientious than others about recording each trip; presumably there were busy times for all agents when some trips were not recorded, or when records were made later from memory with the consequent possibilities for error. Also, no effort was made to count the number of persons in each elevator for each trip. Nor was an effort made to distinguish between handicapped and non-handicapped users of the elevators.

Following are the counts of the numbers of trips made by elevators as reported by the BART station agents:

(see next page)

Frequency of Elevator Use in BART Stations: Ten Days of Operations

East Bay Stations

Average DAILY Number of Trips

Station	8/21-9/4 '73	8/19-8/30 '74
MacArthur	5.8	1.8
19th	.2	2.5
12th	2.4	3.3
Lake Merritt	3.1	9.3
Fruitvale	.9	8.6
Coliseum	--**	--*
San Leandro	4.9	4.8
Bay Fair	2.5	.7
Hayward	4.6	7.0
So. Hayward	1.1	1.5
Union City	2.2	1.6
Fremont	7.2	9.7
Ashby	0	3.5
Berkeley	1.7	13.1
North Berkeley	.9	.8
El Cerrito Plaza	3.6	1.6
El Cerrito del Norte	1.6	3.4
Richmond	2.1	6.9
Rockridge	.3	.1
Orinda	1.0	.5
Lafayette	1.6	.4
Walnut Creek	1.4	2.1
Pleasant Hill	2.9	.7
Concord	4.5	1.2
Total Daily Average	56.5	85.1

*Public elevator between street and concourse not yet installed; private elevator available but inconvenient

**Elevator not installed

Frequency of Elevator Use in BART Stations:

Ten Days of Operations

West Bay Stations*

Average DAILY Number of Trips

Station	8/19-8/30 '74
Montgomery	2.1
Powell	4.8
Civic Center	1.6
16th Street	2.0
24th Street	3.9
Glen Park	1.2
Balboa Park	2.2
Daly City	13.5
Total Average Daily	31.3
Total Average Daily East Bay and West Bay	116.4

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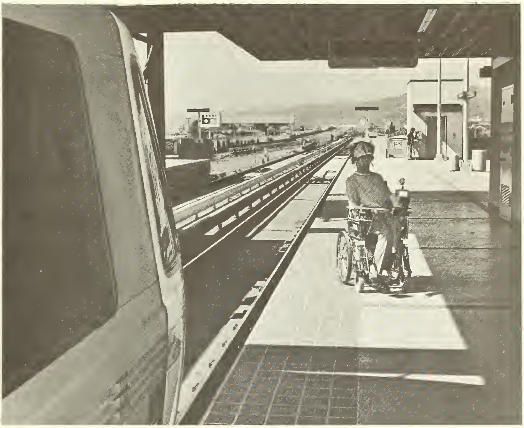
*The West Bay BART line was not in operation at the time of the 1973 elevator counts.



Distance shown from train to elevator

Crossing street to get to elevator structure.

While the frequency of daily usage of elevators remains too low to afford a basis for a firm analysis of trends in the usage of elevators, it is apparent that the Berkeley and Daly City stations' elevators are the most frequently utilized. In Berkeley this can be explained by several factors: the University has attracted a substantial number of handicapped young people as part of its student body; the Center for Independent Living, an organization which provides a wide variety of services to disabled and blind individuals is located near the downtown Berkeley station; and the City of Berkeley has provided curb cuts at all major intersections, making access to the station relatively easy for persons in wheelchairs.

Frequency or infrequency of usage is not easily analyzed at other stations. Elevator usage does not vary with patronage volume in a predictable manner. At the Daly City Station patronage volume is high and platforms, stairs and escalators are crowded at peak hours. BART observers report that the elevators are sometimes used as a supplementary means of traveling between platform and street levels by persons without handicaps or physical burdens. It is reasonable to assume that the total number of elevator trips represents trips by both physically handicapped persons and persons who choose the elevator for a variety of other reasons.

The concept of a "range of mobility", as explained by Hale Zukas, one of the study team members, has a bearing on the frequency of usage of the BART facilities by persons with handicaps. One's "range of mobility" is the area in which an individual perceives himself as being able to travel. Not only must the means of transportation be available to a handicapped person, but such a person must be able to expand his perceived travel needs and abilities. The expansion of one's range of mobility takes place slowly, in general. Since BART is intended to serve those with highly developed ranges of mobility, and it is likely that a physically disabled person's range of mobility has been arrested at an early age, the subjective perception of one's ability to travel a substantial number of miles independently may take a substantial period of time. "People who have been immobile for years simply have no idea of the impact mobility can have on their lives," says Mr. Zukas. Usage of the system by handicapped persons can be expected to expand very gradually as perceptions change and as the means of access to stations improve .[15]

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[15] Hale Zukas, Why Aren't Disabled People Using BART? Unpublished paper, (n.d.).

APPENDIX

American Standards Association Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped

A117.1-1961

SECTION NO.

4 GRADING

4.1 The grading of ground, even contrary to existing topography so that it attains a level with a normal entrance which will make a facility accessible to individuals with physical disabilities.

4.2 Walks

4.2.1 Public walks should be at least 48 inches wide and should have a gradient not greater than 5 percent.

4.2.2 Such walks shall be of a continuing common surface, not interrupted by steps or abrupt changes in level.

4.2.3 Wherever walks cross other walks, driveways, or parking lots they should blend to a common level.

4.2.4 A walk shall have a level platform at the top which is at least 5 feet by 5 feet, if a door swings out, onto the platform or toward the walk. This platform shall extend at least 1 foot beyond each side of the doorway.

4.2.5 A walk shall have a level platform at least 3 feet deep and 5 feet wide, if the door does not swing onto the platform or toward the walk. This platform shall extend at least 1 foot beyond each side of the doorway.

4.3 Parking Lots

4.3.1 Spaces that are accessible and approximate to the facility should be set aside and identified for use by individuals with physical disabilities.

4.3.2 A parking space open on one side, allowing room for individuals in wheelchairs or individuals on braces and crutches to get in and out of an automobile onto a level surface, suitable for wheeling and walking, is adequate.

4.3.3 Parking spaces for individuals with physical disabilities when placed between two conventional diagonal or head-on parking spaces should be 12 feet wide.

4.3.4 Care in planning should be exercised so that individuals in wheelchairs and individuals using braces and crutches are not compelled to wheel or walk behind parked cars.

4.3.5 Consideration should be given the distribution of spaces for use by the disabled in accordance with the frequency and persistency of parking needs.

4.3.6 Walks shall be in conformity with 4.2.

5. BUILDINGS

5.1 Ramps with Gradients. Where ramps with gradients are necessary or desired, they shall conform to the following specifications:

5.1.1 A ramp shall not have a slope greater than 1 foot rise in 12 feet, or 8.33 percent, or 4 degrees 50 minutes.

5.1.2 A ramp shall have handrails on at least one side, and preferably two sides, that are 32 inches in height, measured from the surface of the ramp, that are smooth, that extend 1 foot beyond the top and bottom of the ramp.

5.1.3 A ramp shall have a surface that is nonslip.

5.1.4 A ramp shall have a level platform at the top which is at least 5 feet by 5 feet, if a door swings out onto the platform or toward the ramp. This platform shall extend at least 1 foot beyond each side of the doorway.

5.1.5 A ramp shall have a level platform at least 3 feet deep and 5 feet wide, if the door does not swing onto the platform or toward the ramp. This platform shall extend at least 1 foot beyond each side of the doorway.

5.1.6 Each ramp shall have at least 6 feet of straight clearanc at the bottom.

5.1.7 Ramps shall have level platforms at 30-foot intervals for purposes of rest and safety and shall have level platforms wherever they turn.

5.2 Entrances

5.2.1 At least one primary entrance to each building shall be usable by individuals in wheelchairs.

5.2.2 At least one entrance usable by individuals in wheelchairs shall be on a level that would make the elevators accessible.

5.3 Doors and Doorways

5.3.1 Doors shall have a clear opening of no less than 32 inches when open and shall be operable by a single effort.

5.3.2 The floor on the inside and outside of each doorway shall be level for a distance of 5 feet from the door in the direction the door swings and shall extend 1 foot beyond each side of the door.

5.3.3 Sharp inclines and abrupt changes in level shall be avoided at doorsills. As much as possible, thresholds shall be flush with the floor.

5.4 Stairs. Stairs shall conform to American Standard A9.1- 195 with the following additional considerations:

5.4.1 Steps in stairs that might require use by those with disabilities defined in 2.2 and 2.5 or by the aged shall not have abrupt (square) nosing.

5.4.2 Stairs shall have handrails 32 inches high as measured from the tread at the face of the riser.

5.4.3 Stairs shall have at least one handrail that extends at least 18 inches beyond the top step and beyond the bottom step.

5.4.4 Steps should, wherever possible, and in conformation with existing step formulas, have risers that do not exceed 7 inches.

5.5 Floors

5.5.1 Floors shall have a surface that is nonslip.

5.5.2 Floors on a given story shall be of a common level throughout or be connected by a ramp in accord with 5.1.1 through 5.1.6, inclusive.

5.6 Toilet Rooms. It is essential that an appropriate number of toilet rooms, in accordance with the nature and use of a specific building or facility, be made accessible to, and usable by, the physically handicapped.

5.6.1 Toilet rooms shall have space to allow traffic of individuals in wheelchairs.

5.6.2 Toilet rooms shall have at least one toilet stall that:

1) is 3 feet wide

2) is at least 4 feet 8 inches, preferably 5 feet deep

3) has a door (where doors are used) that is 32 inches and swing out

4) has handrails on each side, 33 inches high and parallel to the floor, 1 1/2 inches in outside diameter, with 1 1/2 inches clearance between rail and wall, and fastened securely at ends and center

5) has a water closet with the seat 20 inches from the floor

5.6.3 Toilet rooms shall have lavatories with narrow aprons, which when mounted at standard height are usable by individuals in wheelchairs; or shall have lavatories mounted higher, when particular designs demand, so that they are usable by individuals in wheelchairs.

5.6.4 Some mirrors and shelves shall be provided above lavatories at a height as low as possible and no higher than 40 inches above the floor, measured from the top of the shelf and the bottom of the mirror.

5.6.5 Toilet rooms for men shall have wall-mounted urinals with the opening of the basin 19 inches from the floor, or shall have floor-mounted urinals that are on level with the main floor of the toilet room.

5.6.6 Toilet rooms shall have an appropriate number of towel racks, towel dispensers, and other dispensers and disposal units mounted no higher than 40 inches from the floor.

5.7 Water Fountains. An appropriate number of water fountains or other water-dispensing means shall be accessible to, and usable by, the physically disabled.

5.7.1 Water fountains or coolers shall have up-front spouts and controls.

5.7.2 Water fountains or coolers shall be hand-operated or hand- and foot-operated.

5.8 Public Telephones. An appropriate number of public tele-

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phones should be made accessible to, and usable by, the physically disabled.

5.8.1 Such telephones should be placed so that the dial and the handset can be reached by individuals in wheelchairs.

5.8.2 An appropriate number of public telephones should be equipped for those with hearing disabilities and so identified with instructions for use.

5.9 Elevators. In a multiple-story building, elevators are essential to the successful functioning of physically disabled individuals. They shall conform to the following requirements:

5.9.1 Elevators shall be accessible to, and usable by, the physically disabled on the level that they use to enter the building, and at all levels normally used by the general public.

5.9.2 Elevators shall allow for traffic by wheelchairs.

5.10 Controls. Switches and controls for light, heat, ventilation, windows, draperies, fire alarms, and all similar controls of frequent or essential use, shall be placed within the reach of individuals in wheelchairs.

5.11 Identification. Appropriate identification of specific facilities within a building used by the public is particularly essential to the blind.

5.11.1 Raised letters or numbers shall be used to identify rooms or offices.

*5.11.2 Such identification should be placed on the wall, to the right or left of the door, at a height between 4 feet 6 inches and 5 feet 6 inches, measured from the floor, and preferably at 5 feet.

*5.11.3 Doors that are not intended for normal use, and that might prove dangerous if a blind person were to exit or enter by them, should be made quickly identifiable to the touch by knurling the door handle or knob.

*5.12 Warning Signals

*5.12.1 Audible warning signals shall be accompanied by simultaneous visual signals for the benefit of those with hearing disabilities.

*5.12.2 Visual signals shall be accompanied by simultaneous audible signals for the benefit of the blind.

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*These sections of the ASA Standards were not included in AB7, the California legislation passed in 1968 which was based on ASA specifications.

5.13 Hazards. Every effort shall be exercised to obviate hazards to individuals with physical disabilities.

5.13.1 Access panels or manholes in floors, walks, and walls can be extremely hazardous, particularly when in use, and should be avoided.

5.13.2 When manholes or access panels are open and in use, or when an open excavation exists on a site, particularly when it is approximate to normal pedestrian traffic, barricades shall be placed on all open sides, at least 8 feet from the hazard, and warning devices shall be installed in accord with 5.12.2.

5.13.3 Low-hanging door closers that remain within the opening of a doorway when the door is open, or that protrude hazardously into regular corridors or traffic ways when the door is closed, shall be avoided.

5.13.4 Low-hanging signs, ceiling lights, and similar objects or signs and fixtures that protrude into regular corridors or traffic ways shall be avoided. A minimum height of 7 feet, measured from the floor, is recommended.

5.13.5 Lighting on ramps shall be in accord with 1201, 1202, 1203, and 1204 of American Standard A9.1-1953.

5.13.6 Exit signs shall be in accord with 1205 of of American Standard A9.1-1953, except as modified by 5.11 of this standard.

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